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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/686,814

Applicant(s)

FULLERTON ET AL.

Examiner

Sam K. Ahn

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 September 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-100 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18, 20, 25-35, 39-42, 47-53, 56-72, 74-89 and 91-100 is/are rejected.
- 7) ☒ Claim(s) 19, 21-24, 36-38, 43-46, 54, 55, 73 and 90 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

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DETAILED ACTION***Response to Arguments***

1. Applicant's arguments filed 09/20/07 have been fully considered but they are not persuasive.

Applicants assert that McCorkle does not teach emulating a waveform or a prototype signal as recited in each of the independent claims. The examiner disagrees.

McCorkle '665 teaches the limitation as a candidate signals (note c.9, 141-53) controlled by the timing generator 108 in Fig.1a having a waveform as illustrated in Fig.1b. Therefore, prior art teaches the claimed limitations, as again explained below.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5, 7-18, 20, 28-35, 39-42, 47-53, 56-72, 74-89 and 91-100 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCorkle US 6,975,665 B1 (McCorkle) in view of Dress, Jr. et al. US 6,606,350 B2 (Dress).

Regarding claim 1, McCorkle teaches a method of emulating a desired waveform (see Fig.1b), comprising: producing a time profile of said desired waveform

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characterized by a plurality of sample values (producing time profile in Fig.15 of t1-t14, wherein one skilled in the art would recognize that the time profile used for receiver of Fig.15 is also used for a transmitter characterized by sample values, see 108₀ in Fig.2, further shown in Figs.3 and 8 of DAC inputs and outputs, candidate signals, note c.9, I.41-53); generating a RF waveform, each RF waveform of said RF waveform having energy scaled in accordance with a corresponding one of the plurality of sample values of said time profile (McCorkle teaches that the modulation used for transmitting the waveform is various modulation types including amplitude modulation, c.6, I.40, wherein one skilled in the art would recognize that the amplitude modulation scales energy). However, McCorkle does not explicitly teach generating a plurality of RF waveforms.

Dress teaches a UWB transmitter in Fig.10 wherein each of the modulators (1004) produces its waveform, hence provides plurality of waveforms. Both McCorkle and Dress teach a UWB transmitter, wherein Dress further suggests providing the plurality of waveforms in order to provide a versatile, multi-bit, very broadband, high bit-rate data communications system, c.1, I.55-57. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate the teaching of Dress in the system of McCorkle by producing plurality of waveforms for the purpose of providing a versatile, multi-bit, very broadband, high bit-rate data communications system, c.1, I.55-57.

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Regarding claim 2, McCorkle in view of Dress further teaches wherein said plurality of RF waveforms (as previously explained) are generated in accordance with a timing of a plurality of samples corresponding to said plurality of sample values (plurality of samples from 804 in Fig.8).

Regarding claim 3, McCorkle in view of Dress further teaches wherein the energy of each generated RF waveform is scaled by at least one of patterning, making, regulating, setting, or estimating according to a corresponding sample value one of the plurality of sample values relative to a reference value (see setting of equation 7 of McCorkle).

Regarding claim 4, McCorkle in view of Dress further teaches wherein the reference value is a maximum sample value of the plurality of sample values (see setting equation 7 of McCorkle wherein one skilled in the art would recognize that the equation derives a maximum and minimum values).

Regarding claim 5, McCorkle in view of Dress further teaches wherein at least one of amplitude, width or type of each RF waveform of said plurality of RF waveforms is determined in accordance with a corresponding one of said plurality of sample values (wherein through the 804 ROM providing output to the waveform generator 118 in Fig.2, amplitude modulation is implemented, c.6,1.40 of McCorkle).

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Regarding claim 7, McCorkle further teaches wherein the type of each RF waveform comprises at least one of a wavelet, an impulse, gaussian pulse, doublet pulse, triplet pulse, step pulse, triangle pulse, sawtooth pulse, or burst of cycles (wavelet, c.6, l.26).

Regarding claim 8, McCorkle further teaches wherein said time profile corresponds to a desired frequency profile (sample of a time profile corresponds to a desired frequency profile, see Fig. 1b).

Regarding claim 9, McCorkle further teaches wherein the desired frequency profile corresponds to a notch, a spike, a roll off, or a frequency mask within a frequency band of interest (see Fig. 1b, the frequency bandwidth within $G(w)$).

Regarding claim 10, McCorkle in view of Dress teaching plurality of RF waveforms, further teaches wherein each RF waveform of the plurality of RF waveforms has a bandwidth that spans a frequency band of interest (see Fig. 1b and note c.8, l.53-63).

Regarding claim 11, McCorkle further teaches further comprising: limiting an aggregate energy spectra of the plurality of RF waveforms to a frequency band of interest (see 202 in Fig. 2).

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Regarding claim 12, McCorkle further teaches limiting an aggregate energy spectra of the plurality of RF waveforms to select at least one harmonic of a plurality of harmonics of a desired signal (see 202 in Fig.2 and note c.13, l.57-65, hence waveforms with different harmonics outside the desired bandwidth would be eliminated and only select harmonics within the bandwidth).

Regarding claim 13, McCorkle further teaches wherein said one or more harmonics correspond to one or more communications channels (the harmonics of waveform of Fig.1b implemented in the channel path of transmission in Fig.2).

Regarding claim 14, McCorkle further teaches wherein said one or more harmonics (output of 118 in Fig.2) are selected in accordance with a code that defines a communications channel (122 outputting Δt , based on the user code, c.13, l.21, to the timing generator, wherein the timing generator defines the communication channel with the waveform providing the harmonics).

Regarding claim 15, McCorkle further teaches further comprising filtering an aggregate energy spectra of the plurality of RF waveforms in accordance with a code (122 outputting Δt , based on the user code, c.13, l.21, to the timing generator, wherein the timing generator defines the communication channel with

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the waveform providing the harmonics, and filtering at 202 in Fig.2 with the desired bandwidth, as previously explained).

Regarding claim 16, McCorkle further teaches further comprising modulating the plurality of RF waveforms in accordance with an information signal (modulating with amplitude modulation, as previously explained with TX Data Out in Fig.2).

Regarding claim 17, Dress further teaches wherein the plurality of RF waveforms are generated in one or more groups, each group of the one or more groups comprising two or more RF waveforms having a predefined time spacing (group of RF waveforms in a predefined time spacing, see Fig.7).

Regarding claim 18, Dress further teaches wherein at least one RF waveform of each group is inverted (note c.9, l.40).

Regarding claim 20, McCorkle further teaches wherein a polarity of each RF waveform of said plurality of RF waveforms is in accordance with a polarity of a corresponding one of the plurality of sample values of said time profile (see Fig.15 wherein the RF waveforms of polarity of high and low or plus and minus corresponds to S6).

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Regarding claims 28-30, although McCorkle in view of Dress does not explicitly teach wherein the timing of the plurality of samples corresponds to a Nyquist sampling rate (greater than or less than the Nyquist rate) at a frequency within a frequency band of interest, it is well-known in the art that Nyquist rate is the optimal rate of sampling signals in order to recover the samples. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to implement as such. Applicant has not disclosed that varying the rate provides an advantage, is used for a particular purpose or solves a stated problem.

One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with other rates because the base is the Nyquist rate, which is well-known in the art of providing the optimal sampling rate.

Sampling at higher or lower than the Nyquist rate would add or reduce complexity to the signal itself, hence increase or decrease system computation load. Therefore, it would have been obvious to one of ordinary skill in this art to modify to obtain the invention as specified in the claims.

Regarding claim 31, McCorkle further teaches wherein the time profile corresponds to the time profile of an enveloped sine wave signal (the waveform modulated with amplitude modulation or the envelope sine wave signal corresponds with the time profile in Fig.15).

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Regarding claim 32, McCorkle further teaches wherein the carrier frequency of the enveloped sine wave signal corresponds to a center frequency within a frequency band of interest (note c.6, l.40, c.7, l.53-63).

Regarding claim 33, McCorkle further teaches wherein the enveloped sine wave signal has an envelope shape comprising at least one of a cosine, raised cosine, trapezoid, and rectangle (see Fig.1b of $g(t)$ having cosine form).

Regarding claim 34, McCorkle further teaches wherein the time profile is programmable (see 804 in Fig.8, wherein one skilled in the art would recognize that ROM are implemented after programming).

Regarding claim 35, McCorkle further teaches wherein the peak amplitude of the time profile is programmable (see 804 in Fig.8, wherein one skilled in the art would recognize that ROM are implemented after programming, the amplitudes including peak of the waveform is derived from equation 7).

Regarding claim 39, McCorkle in view of Dress further teaches wherein the time profile of the desired waveform corresponds to a composite profile of a plurality of orthogonal waveforms (time profile for each of the waveforms in Fig.6 of Dress are orthogonal, note c.9, l.39).

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Regarding claims 40-42, McCorkle in view of Dress further teaches wherein the plurality of orthogonal waveforms are orthogonal when arriving at different times at a receiver (wherein one skilled in the art would recognize that the orthogonality of the waveforms are present even at the time the signals are received by a receiver, as the purpose of the orthogonality is to preserve the information of each waveforms, hence, at the reception, orthogonality should be preserved in order to properly detect the information from the waveforms).

Regarding claim 47, McCorkle further teaches wherein the desired waveform is modulated by an information signal (TX Data Out in Fig.2).

Regarding claim 48, McCorkle further teaches wherein the desired waveform is in accordance with a code (TX Data Out coded by 122 in Fig.2).

Regarding claim 49, McCorkle further teaches wherein the duration of the time profile corresponds to a bandwidth of the desired waveform (see Fig. 1b) of time of each waveform of the time profile in Fig. 15 each of the time corresponding to the bandwidth $G(w)$.

Regarding claim 50, McCorkle further teaches wherein the duration of the time profile corresponds to a bandwidth of each harmonic of a plurality of harmonics

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(see Fig. 1b of time of each waveform of the time profile in Fig. 15 each of the time duration corresponding to the bandwidth $G(w)$).

Regarding claim 51, McCorkle further teaches wherein the time profile corresponds to that of at least one of a time limited desired waveform and a frequency limited desired waveform (see Fig. 1b of time of each waveform of the time profile in Fig. 15 each of the time duration corresponding to the bandwidth $G(w)$).

Regarding claim 52, McCorkle further teaches wherein the time profile is produced by an inverse Fourier transformation of a frequency profile of the desired waveform (see Fig. 1b of time of each waveform of the time profile in Fig. 15 each of the time duration corresponding to the bandwidth $G(w)$ by IFT).

Regarding claim 53, McCorkle further teaches wherein the frequency profile is produced by a Fourier transformation of a vector amplitude profile of the desired waveform (see Fig. 1b of time of each waveform of the time profile in Fig. 15 each of the time duration corresponding to the bandwidth, from $g(t)$ to $G(w)$ by FT).

Regarding claim 56, McCorkle further teaches wherein the time profile is defined by frequency, phase, and amplitude parameters, wherein at least one of the amplitude parameter and phase parameter is maintained constant over a

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specified bandwidth (see Fig. 1b of time of each waveform of the time profile in Fig. 15 each of the time duration corresponding to the bandwidth, time profile defined by amplitude between 1 and -1, phase of Phase_{0-N} and R_{phase} in Fig. 8 and frequency $g(t)$, the amplitude maintained at 0 between time 0 and time 1).

Regarding claim 57, McCorkle in view of Dress further teaches wherein the plurality of RF waveforms have substantially the same amplitude (each of the modulations of Dress in MOD2 – MOD8 in Fig. 10 implementing amplitude modulation, hence have substantially the same amplitude), and wherein the widths of the plurality of RF waveforms are scaled (see 202 in Fig. 2).

Regarding claim 58, McCorkle in view of Dress further teaches wherein the plurality of RF waveforms have substantially the same width (see 202 in Fig. 2) and wherein the amplitudes of the plurality of RF waveforms are scaled (each of the modulations of Dress in MOD2 – MOD8 in Fig. 10 implementing amplitude modulation, hence are accordingly scaled).

Regarding claim 59, McCorkle in view of Dress further teaches wherein at least one of a width and an amplitude of each RF waveform of the plurality of RF waveforms is scaled (width is scaled, see 202 in Fig. 2).

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Regarding claim 60, McCorkle in view of Dress further teaches wherein each of said plurality of RF waveforms is separately generated (MOD2 – MOD8 in Fig.10).

Regarding claim 59, McCorkle in view of Dress further teaches wherein each RF waveform of the plurality of RF waveforms is scaled to maintain a defined amplitude/width ratio (the amplitude and width are defined, as previously explained in claims 58-60, hence the amplitude/width ratio is also defined constantly while in operation).

Regarding claim 62, McCorkle in view of Dress further teaches wherein the plurality of RF waveforms (as previously explained) comprise at least one of a plurality of digital waveforms and a plurality of analog waveforms (see Fig.1b g(t)).

Regarding claim 63, McCorkle in view of Dress further teaches wherein the plurality of analog waveforms are generated in response to one or more digital signals of a plurality of digital signals that correspond to the plurality of sample values (in response to the ROM LUT in Fig.8, analog waveforms are generated).

Regarding claim 64, McCorkle in view of Dress further teaches wherein the plurality of digital signals are stored in a memory (ROM LUT in Fig.8).

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Regarding claim 65, McCorkle teaches a method for generating waveforms, comprising: generating a RF waveform at a waveform generation rate (rate output by 1080); and modulating (118 by amplitude modulation, as previously explained) the RF waveform in accordance with samples of a time profile of a prototype signal (316,318 and 802) to produce an aggregate RF energy (312,314) that approximates the RF energy of the prototype signal (316,318 and 802).

However, McCorkle does not explicitly teach generating a plurality of RF waveforms.

Dress teaches a UWB transmitter in Fig.10 wherein each of the modulators (1004) produces its waveform, hence provides plurality of waveforms. Both McCorkle and Dress teach a UWB transmitter, wherein Dress further suggests providing the plurality of waveforms in order to provide a versatile, multi-bit, very broadband, high bit-rate data communications system, c.1,1,55-57. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate the teaching of Dress in the system of McCorkle by producing plurality of waveforms for the purpose of providing a versatile, multi-bit, very broadband, high bit-rate data communications system, c.1,1,55-57.

Regarding claim 66, McCorkle further teaches further comprising limiting the aggregate RF energy to a frequency band of interest (202 in Fig.2).

Regarding claim 67, McCorkle further teaches wherein the plurality of RF waveforms are modulated by at least one of amplitude modulation and width modulation (amplitude modulation, c.6,1.40).

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Regarding claim 68, McCorkle further teaches wherein the waveform generation rate is selected in accordance with a center frequency within a frequency band of interest (see Freq_0 in Fig.2).

Regarding claim 69, McCorkle teaches all subject matter claimed, as applied to claim 65. And although McCorkle does not explicitly teach wherein the waveform generation rate is selected to place a fold image outside of a frequency band of interest, one skilled in the art would recognize that filter 202 removes the signals outside the frequency of interest, hence one skilled in the art would further recognize that placing signals at a generation rate resulting in outside the frequency band of interest, the filtering properly compensates).

Regarding claim 70, McCorkle teaches all subject matter claimed, as applied to claim 65. And although McCorkle does not explicitly teach wherein the waveform generation rate corresponds to a rate that is at least twice a selected frequency within a frequency band of interest, one skilled in the art would recognize that this is to conform to the well-known Nyquist rate.

Regarding claim 71, McCorkle teaches all subject matter claimed, as applied to claim 65. And although McCorkle does not explicitly teach wherein the waveform generation rate corresponds to a rate that is at least twice a selected frequency within a frequency band of interest, one skilled in the art would recognize that the

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this is to conform to the well-known Nyquist rate. And in regards to the limitation of wherein the waveform generation rate corresponds to a rate that is less than twice a selected frequency within a frequency band of interest, note explanation as applied to claim 28.

Regarding claim 72, the claim is rejected as applied to claim 17 with similar scope.

Regarding claim 74, the claim is rejected as applied to claim 67 with similar scope.

Regarding claim 75, McCorkle further teaches separately generating a plurality of variable amplitude RF waveforms (118 by amplitude modulation, as previously explained, wherein one skilled in the art would recognize that amplitude modulation produces amplitude varying).

Regarding claim 76, McCorkle further teaches further comprising: digitally representing each of the plurality of variable amplitude RF waveforms in terms of quantized amplitude representations (ROM LUT in Fig.8).

Regarding claim 77, McCorkle further teaches storing the quantized amplitude representations in a memory (ROM LUT in Fig.8).

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Regarding claim 78, McCorkle further teaches retrieving said quantized amplitude representations from the memory and applying them to a digital to analog converter (ROM LUT in Fig.8 applied to 812, 814).

Regarding claim 79, McCorkle further teaches wherein each RF waveform of the plurality of RF waveforms comprises one of an impulse, gaussian pulse, doublet pulse, triplet pulse, step pulse, triangle pulse, sawtooth pulse, and burst of cycles (UWB system producing impulse signals).

Regarding claim 80, McCorkle further teaches wherein the time spacing between each of said plurality of RF waveforms is substantially the same (see Fig.15).

Regarding claim 81, McCorkle further teaches wherein the time spacing corresponds to a center frequency of the aggregate RF energy (see Fig.1b).

Regarding claim 82, the claim is rejected as applied to claim 50 with similar scope.

Regarding claim 83, the claim is rejected as applied to claim 13 with similar scope.

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Regarding claim 84, McCorkle teaches a waveform generator (see Fig. 2), comprising: a signal generator (118) that generates a RF waveform at a waveform generation rate (rate output by 108₀), the RF waveform having an amplitude scaled in accordance with a desired envelope (amplitude modulation, as previously explained); and a filter that limits the aggregate RF energy of the plurality of RF waveforms to within a frequency band of interest (202 in Fig. 2).

However, McCorkle does not explicitly teach generating a plurality of RF waveforms.

Dress teaches a UWB transmitter in Fig. 10 wherein each of the modulators (1004) produces its waveform, hence provides plurality of waveforms. Both McCorkle and Dress teach a UWB transmitter, wherein Dress further suggests providing the plurality of waveforms in order to provide a versatile, multi-bit, very broadband, high bit-rate data communications system, c. 1,1,55-57. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate the teaching of Dress in the system of McCorkle by producing plurality of waveforms for the purpose of providing a versatile, multi-bit, very broadband, high bit-rate data communications system, c. 1,1,55-57.

Regarding claim 85, the claim is rejected as applied to claim 66 with similar scope.

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Regarding claim 86, the claim is rejected as applied to claim 69 with similar scope.

Regarding claim 87, the claim is rejected as applied to claim 70 with similar scope.

Regarding claim 88, the claim is rejected as applied to claim 71 with similar scope.

Regarding claim 89, the claim is rejected as applied to claim 72 with similar scope.

Regarding claim 91, the claim is rejected as applied to claim 74 with similar scope.

Regarding claim 92, the claim is rejected as applied to claim 75 with similar scope.

Regarding claim 93, the claim is rejected as applied to claim 76 with similar scope.

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Regarding claim 94, the claim is rejected as applied to claim 77 with similar scope.

Regarding claim 95, the claim is rejected as applied to claim 78 with similar scope.

Regarding claim 96, the claim is rejected as applied to claim 80 with similar scope.

Regarding claim 97, the claim is rejected as applied to claim 81 with similar scope.

Regarding claim 98, the claim is rejected as applied to claim 82 with similar scope.

Regarding claim 99, the claim is rejected as applied to claim 83 with similar scope.

Regarding claim 100, the claim is rejected as applied to claim 20 with similar scope.

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1. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over McCorkle US 6,975,665 B1 (McCorkle) in view of Dress, Jr. et al. US 6,606,350 B2 (Dress) and Steinberg et al. US 5,808,962 (Steinberg).

Regarding claim 6, McCorkle in view of Dress teaches all subject matter claimed as applied to claim 1, however, does not explicitly teach wherein the amplitude comprises root mean squared (RMS) amplitude.

Steinberg teaches wherein the amplitude comprises root mean squared (RMS) amplitude (note wherein the waveform of UWB arrays are similar to NB array when amplitude comprises RMS amplitude, c.14, l.40-52). Hence, McCorkle and Steinberg teach a UWB system, wherein Steinberg further suggests that RMS amplitudes of the sidelobe levels NB array are equivalent to UWB arrays when equation 7, 8 holds) in order to properly evaluate sidelobe levels, c.14, l.25-27. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate the teaching of Steinberg in the system of McCorkle by having the amplitudes comprise RMS amplitude for the purpose of properly evaluating the sidelobe levels, c.14, l.25-27.

2. Claims 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCorkle US 6,975,665 B1 (McCorkle) in view of Dress, Jr. et al. US 6,606,350 B2 (Dress) and McCorkle US 6,937,646 B1 (McCorkle '646).

Regarding claim 25, McCorkle in view of Dress teaches all subject matter claimed as applied to claim 2, however, does not explicitly teach dithering the timing of each

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RF waveform of the plurality of RF waveforms to suppress at least one harmonic within a frequency band of interest.

McCorkle '646 teaches dithering the timing of each RF waveform of the plurality of RF waveforms to suppress at least one harmonic within a frequency band of interest (36 in Fig. 6, wherein one skilled in the art would recognize that 34 in Fig. 16 of dithering is also implemented to time-align with signal RF, note c.6, l.4-7, hence suppress at least one harmonic). Hence both McCorkle and McCorkle '646 teach a UWB transceiver, wherein McCorkle further suggests dithering in the timing generator in order to time-align with signal RF. Therefore, it would have been obvious to one skilled in the art at the time the invention was made incorporate the teaching McCorkle '646 in the system of McCorkle for the purpose of time-aligning with signal RF, as previously explained.

Regarding claim 26, and although McCorkle '646 does not further teach wherein the timing of each RF waveform is dithered pseudorandomly, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to implement as such. Applicant has not disclosed that such implementation provides an advantage, is used for a particular purpose or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with dithering because time-aligns with signal RF. Furthermore, pseudorandom generation is well-known in the art to be almost pure random signal

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generating method, hence is another form of dithering. Therefore, it would have been obvious to one of ordinary skill in this art to modify to obtain the invention as specified in the claim.

Regarding claim 27, McCorkle '646 further teaches wherein the timing of each RF waveform is dithered in accordance with a code (code representing 0 and 1 in Fig.1A).

Allowable Subject Matter

3. Claims 19,21-24,36-38,43-46,54,55,73 and 90 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Perthold et al. US 7,170,951 B1 teach emulating a desired waveform or prototype signal.

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sam Ahn whose telephone number is (571) 272-3044. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Sam K. Ahn
Patent Examiner

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